

REMARKS

Claims 1 – 15 are pending in this application with claims 1, 5 and 11 being amended and claims 2 – 4, and 12 being cancelled by this response. Claim 1 has been amended to include the features contained in originally filed claims 2 – 4. Claim 11 has been amended to include similar features as well as the feature of originally filed claim 12. Applicant respectfully submits that no new matter is added by the amendments to the claims.

Objection to the Information Disclosure Statement

In response to the objection of the Examiner, an Information Disclosure Statement properly identifying the references uncovered in the International Search Report for the PCT Patent Application, on which the present application is based, is submitted herewith for consideration. Additionally, the presentation entitled “Tidal Turbine Technology” indicated on page 1 of the present application is identified on the IDS being submitted and a copy of which is enclosed. Applicant respectfully submits that the references cited in the attached IDS do not affect the patentability of the present claimed invention. Thus, Applicant requests review and consideration of the cited references.

Objection to the Drawings

The Examiner objects to the drawings as failing to show the first, second and third electrical signal and requests appropriate correction thereof. Applicant respectfully submits that, for the reasons presented below, the first, second and third electrical signals are clearly supported in the diagram of Figure 1 and the corresponding description in the specification. Thus, it is further respectfully submitted that no new or corrected drawings are needed.

Support for the claimed first electrical signal may be found on page 6, lines 20 – 24 wherein it states “Each turbine 2 has blades 3 which are rotated by a tidal flow of water, to

power a respective generator 4 which output AC electrical power via a respective transformer 5 to a cable 6 and appropriate switchgear 7". Thus, Applicant respectfully submits that the "AC electrical power" is the claimed "first electrical signal" which is being output and transmitted over "cable 6". Thus, the "first electrical signal" is clear from Figure 1 and the corresponding description in the specification. With respect to the claimed "second electrical signal", the specification on page 7, line 3 – 6, provides that "The drive 9 outputs DC electrical signals along cabling 13 to DC/AC converter 14". The DC electrical signal output via cabling 13 is the claimed "second electrical signals" and thus, Applicant respectfully submits that the claimed feature is clear from Figure 1 and the corresponding description in the specification. The "third electrical signal" is described on page 8, lines 2 – 4 which state that "the drive 9 may be controlled by a feedback loop (not shown) matching the output frequency of DC/AC converter 14 to the grid 16". It is well known in the art that a feedback loop as described in the specification that is used for controlling the "drive 9" requires transmission of an electrical feedback signal which corresponds to the claimed "third electrical signal". Therefore, Applicant respectfully submits that clear support for the third electrical signal is contained within Figure 1 and the corresponding description thereof.

In view of the above remarks, Applicant respectfully submits that each of the claimed features are properly supported in Figure 1 and adequately described in the specification. Thus, Applicant respectfully submits that no amendments need to be made to Figure 1. Therefore, withdrawal of the objection to the drawings is respectfully requested.

Objection to the Specification

The Specification is objected to for failing to provide proper antecedent basis for the first, second and third electrical signals, the drive apparatus and the feedback apparatus. Support for the first, second and third electrical signals is provided in the specification and drawings as discussed above with respect to the response to the

Objection to the drawing figures. Specifically, support for the first electrical signal may be found on page 6, lines 20 – 24 wherein it states “Each turbine 2 has blades 3 which are rotated by a tidal flow of water, to power a respective generator 4 which output **AC electrical power** via a respective transformer 5 to a cable 6 and appropriate switchgear 7”. Support for the second electrical signal may be found on page 7, line 3 – 6 which provides that “The drive 9 outputs **DC electrical signals** along cabling 13 to DC/AC converter 14”. Additionally, the support for the “third electrical signal” is described on page 8, lines 2 – 4 which states that “the drive 9 may be controlled by a feedback loop (not shown) matching the output frequency of DC/AC converter 14 to the grid 16”. It is well known in the art that a feedback loop as described in the specification that is used for controlling the “drive 9” requires transmission of an electrical feedback signal which corresponds to the claimed “third electrical signal”. The drive apparatus is shown as element 9 in Figure 1 and discussed in the specification on page 7, lines 3 – 9 and elsewhere. The feedback apparatus is described on page 7, lines 20 – 31 of the specification which states that “When the speed of rotation of each turbine 2 has been set, by means of a controller in the drive 9, to operate at a given efficiency, the frequency of electricity output by each generator 4 depends upon that speed of rotation”. This controller within drive 9 provides support for the claimed feedback apparatus.

In view of the above remarks and cited sections of the specification, Applicant respectfully submits that the specification provides proper antecedent basis for all of the claimed features. Thus, withdrawal of the objection is respectfully requested.

Rejection of claims 1 – 9 and 11 – 15 under 35 USC 112, first paragraph

Claims 1 – 9 and 11 – 15 are rejected under 35 USC 112, first paragraph as failing to comply with the enablement requirement with respect to the first, second and third electrical signals. Applicant respectfully disagrees. Specifically, as provided above with respect to the remarks under the objection to the drawings and specification which are incorporated herein by reference, that the specification fully complies with the requirements of 35 USC 112, first paragraph and enables one skilled in the art to make

and/or use the present claimed invention. Therefore, Applicant respectfully requests that the rejection under 35 USC 112, first paragraph be withdrawn.

Rejection of Claims 1-5, 9 and 11-15 under 35 U.S.C 102(b).

Claims 1-5, 9 and 11-15 are rejected under 35 U.S.C. 102(b) as being anticipated by Haining (U.S. Patent No. 5,440,176).

Amended claim 1 provides an apparatus for generating electrical power from tidal water movement. The apparatus includes at least one electrical turbine adapted to be driven by tidal water movement to generate a respective first electrical signal and at least one drive apparatus located remotely from the or each turbine for receiving the at least one first electrical signal and controlling the speed of rotation of the or each turbine to adjust the efficiency thereof and outputting at least one second electrical signal to supply electrical power generated by the or each turbine. At least one feedback apparatus provides at least one first control signal for use in controlling the speed of rotation of the or each turbine by at least one drive apparatus to adjust the efficiency thereof. At least one control apparatus receives the at least one second electrical signal and outputs at least one third electrical signal to supply electrical power generated by the or each turbine. The at least one control apparatus is adapted to control the frequency of the at least one third electrical signal wherein the at least one feedback apparatus is adapted to apply the at least one first control signal responsive to the frequency of the at least one third electrical signal. For the reasons presented below, Applicant respectfully submits that Haining neither discloses nor suggests each feature claimed in the present invention and therefore does not anticipate the present claimed apparatus.

Haining describes a hydroelectric power plant that includes several combination turbine/generators which are suspended into an ocean current from a submerged tension leg type platform. Each of the turbine/generators are independently positionable in any direction to take advantage of the ocean current at any given time for generating electricity (see Abstract). However, the control mechanism described in Haining is fundamentally

different from and not equivalent to the present claimed “feedback apparatus” which “appl[ies] at least one said first control signal responsive to the frequency of at least one said third electrical signal”. The present claimed apparatus advantageously controls the turbine speed in response to the frequency of the output signal of the DA/AC converter to the power grid (see Application, page 8, lines 2 – 5). Haining fails to provide any 35 USC 112 compliant enabling disclosure of the present claimed feature. Rather, Haining provides for controlling the turbines in response to tidal conditions. Specifically, the Haining system provides a computer controller executing a program that “contains the plotted movement of the ocean current at the location where the subsea hydroelectric plant is located” and that “this information is used to automatically locate the individual turbine/generators to best utilize the current” (see col. 1, lines 57 – 66). The use of tidal patterns and ocean current for controlling turbine position, as in Haining, is wholly unlike the present claimed “at least one feedback apparatus [being] adapted to apply at least one said first control signal responsive to the frequency of at least one said third electrical signal”. In fact, Haining fails to disclose or suggest any mechanism for controlling turbine speed, but rather controls turbine position to increase rotational speed based on the pattern of tidal currents. This is unlike the present claimed invention which provides a control mechanism for controlling turbine speed based on the “frequency of at least one said third electrical signal” to ensure maximum efficiency. The claimed arrangement advantageously increases efficiency of energy production by monitoring the frequency of the power supplied to the grid and feeding this information back in order to control the turbines. Haining fails to provide any enabling disclosure of a mechanism able to operate as the present claimed invention. Therefore, as each element of the present claimed invention is neither disclosed nor suggested by Haining, Applicant respectfully submits that the present claimed invention is not anticipated by Haining. Consequently, withdrawal of the rejection of claim 1 is respectfully requested.

Claims 2 – 4 have been cancelled and incorporated in amended claim 1. Thus, the rejection of claims 2 – 4 is considered moot and should be withdrawn.

Claims 5 and 9 are dependent on claim 1 and are considered patentable for the reasons presented above with respect to claim 1. Consequently, withdrawal of the rejection of claims 5 and 9 is respectfully requested.

Independent claim 11 includes similar features as discussed above with respect to claim 1 and is considered patentable for the reasons presented above with respect to claim 1. Consequently, withdrawal of the rejection of claim 11 is respectfully requested.

Claim 12 is cancelled by this response and has been incorporated in amended claim 11. Thus, the rejection of claim 12 is considered moot and should be withdrawn.

Claims 13 – 15 are dependent on claim 11 and is considered patentable for the reasons presented above with respect to claim 11. Consequently, withdrawal of the rejection of claims 13 – 15 is respectfully requested.

In view of the above remarks and amendments to the claims, Applicant respectfully submits that Haining does not provide any 35 USC 112 compliant enabling disclosure that anticipates the present invention as claimed in amended claim 1 and 11. As claims 5 and 9 are dependent on claim 1 and claims 13 -15 are dependent on claim 11, Applicant respectfully submits that these claims are also not anticipated by Haining. Thus, withdrawal of the rejection of claims 1, 5, 9 and 11 – 15 is respectfully requested.

Rejection of Claims 6-8 under 35 U.S.C. 103(a)

Claims 6-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Haining (U.S. Patent No. 5,440,176) in view of O’Sullivan et al. (U.S. Patent No. 2003/0218338).

Claims 6 – 8 are dependent on claim 1 and are considered patentable for the reasons presented above with respect to claim 1. Specifically, O’Sullivan adds nothing when taken in combination with Haining that discloses or suggest that the “at least one

said feedback apparatus is adapted to apply at least one said first control signal responsive to the frequency of at least one said third electrical signal” as recited in claim 1.

O’Sullivan describes an apparatus and method for extracting a maximum amount of power from a water source that includes a hydroturbine assembly including a shaft and a turbo generator connected to the shaft of the hydroturbine assembly. A frequency sensor senses a frequency output by the generator associated with a turbine speed of the hydroturbine. A power converter converts the electrical output of the turbo generator to a predetermined power value and a power sensor senses an output power of the power converter. A maximum power controller that maximizes a power output of the power converter based on: (a) the frequency of the electrical output of the turbo generator sensed by the frequency sensor; and (b) the output power of the power converter sensed by the power sensor. An energy reservoir receives the output of the power converter and the maximum power controller calculates a maximum power output of the power converter. An algorithm permits the maximum power controller to extract the maximum available power at levels that approach stall torque (See Abstract). Similarly to Haining, O’Sullivan fails to provide any 35 USC 112 compliant enabling disclosure of “said feed back apparatus [being] adapted to apply at least one said first control signal response to **the frequency of at least one said third electrical signal**” for controlling the turbine speed and increase efficiency of energy production by monitoring the frequency of power supplied to the grid and feeding this information back in order to control the turbines. Rather, the O’Sullivan system uses a feedback system to allow for extraction of maximum power based on the tidal flow within a waterway. O’Sullivan, similarly to Haining, is concerned with controlling turbines based in response to tidal flow. This is fundamentally different from the present claimed invention that monitors the frequency of power being provided to the grid and controls the turbine speed in response thereto.

Applicant respectfully submits that, even if one were to combine the system of Haining with the system of O’Sullivan, the result would not make the present claimed invention unpatentable. Both O’Sullivan and Haining are concerned with maximizing

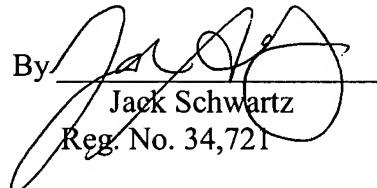
energy extraction based on the tidal flows around each turbine or generator. Thus, the combination of Haining with O’Sullivan would produce a power extraction system that is able to control movement of the turbines position and speed of the turbine based in response to tidal flows of the waterway in which the turbine/generators were disposed. This is fundamentally different from the claimed system which utilizes the frequency of the third electrical signal which is provided to a power grid to cause the apparatus to apply the first control signal which controls the speed of the turbine. There is no 35 USC 112 compliant enabling disclosure in Haining (with O’Sullivan) of the present claimed invention. Consequently, withdrawal of the rejection of claims 6 – 8 is respectfully requested.

In view of the above remarks and amendments to the claims, it is respectfully submitted that O’Sullivan when taken alone or in combination with Haining neither discloses nor suggests the present invention as claimed in claim 1. As claims 6 – 8 are dependent on claim 1, Applicant respectfully submits that claims 6 – 8 are also patentable in view of Haining and/or O’Sullivan. Thus, withdrawal of the rejection of claims 6 – 8 is respectfully submitted.

Having fully addressed the Examiner’s rejections, it is believed that, in view of the preceding amendments and remarks, this application stands in condition for allowance. Accordingly then, reconsideration and allowance are respectfully solicited. If, however, the Examiner is of the opinion that such action cannot be taken, the Examiner is invited to contact the applicant’s attorney at the phone number below, so that a mutually convenient date and time for a telephonic interview may be scheduled.

No fee is believed due. However, if a fee is due and not paid by the attached credit card authorization form, please charge the fee due to Deposit Account No. 50-2828.

Respectfully submitted,
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Starting of the water stationary feeder turbines or the turbopump groups out of turbine, on one or more floors and stationary feeders, has etc considers up to now in two different ways - is hydraulically by action on the bodies of guard, a spherical tap for example, which supplies the water turbine and causes its rotation. - ioit eleetrique - the group is generally pleasing with synchronism by an engine which is in general the principal alternator functioning out of engine. Each one of these two solutions presents disadvantages. - In hydraulic solution, starting causes a dissipationd' energy in the body of guard and thesame one, from where risk of vibration, cavitation, instability. - In electric solution, starting can tire the alternators. Moreover, one can be amenea to start the groups harnesses some to help one reseaudéfaillant, It is not pasa cemoment-l which should be made an important call of power and longuedurcie. The present invention has as an aim a process applicablea such machines consistanta entratnemet to carry out the starting of the group until the speed of synchronism by an engine électriqued', generally made up by the principal alternator functioning out of engine eta will superimpose this action during at least a partieimportante of this starting, the effort of the hydraulic machine of the group by supplying the aforementioned water machine by action on its body of guard. In this process of starting, the hydraulic couples and électriques-stajoutent and it results a fast rise with synchronism from it, with a call of reduced current and a limited heating of the electric machine, as well as the publication of a backpressure importantea the downstream of the body of guard, limiting the cavitationa the exit of this body. According to batch this process one can carry out initially the starting of the electri- group quement by an engine which is generally the principal alternator functioning out of engine, puiså to complete this starting until the speed of synchronism by the superposition of the action of the hydraulic machine of the group functioning out of turbine, by supplying with water the aforementioned machine partouverture of its body of guard. The resistive torque of the group is very faiblea hasse speed, and the driving alternator has an important couple. One can thus make electrically start the group by means of his alternator functioning out of engine, and, when it reaches a given speed (or a given pressure entreorgane of guard and the turbine), to give the order to this body of guard to open, putting in action the hydraulic machine, from which the couple comes to be added to that provided by the alternator-engine. One will be able, for example, to consider a law of starting such as the opening of the body of guard, close to that of the idle run of the hydraulic machine, would be reached when the troop arrives at a frequency close to that of synchronism. After coupling of the group on the network, body of guard achéverait its opening. One can also carry out all the phase of the starting of the group until the speed of synchronism by implementing jointly the electric and hydraulic means, whose couples are added throughout starting.

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